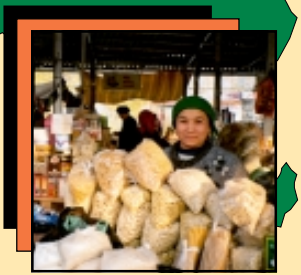
Making a Difference Around the World



IFDC An International Center for Soil Fertility and Agricultural Development

What will the future of tomorrow's child be like? If the prediction of the United Nations proves true, more than 130 million children in the developing countries will be malnourished in 2020. How can we change this scenario and create a greater likelihood of food security and a more stable, prosperous, and peaceful world. Undoubtedly agricultural and economic development can play a pivotal role in creating this desirable paradigm. This booklet explores some of the results of IFDC's work that prove the Center is a credible player in the creation of a more food secure world. IFDC—An International Center for Soil Fertility and Agricultural Development—is making a difference around the world—in Afghanistan, Albania, Azerbaijan, Bangladesh, Benin, Burkina Faso, Ecuador, Ghana, Kenya, Kosovo, Kyrgyzstan, Malawi, Mali, Mozambique, Nepal, Niger, Nigeria, Togo, Uganda, Uruguay, and Vietnam. Throughout the booklet, you will read about people whose lives have been transformed through IFDC's interventions in their countries.

Elisabeth Robert: A Profile of a Transformed Life

A woman farmer–Elisabeth Robert from the small village of Ahohoue, Benin, joined the Integrated Soil Fertility Management (ISFM) project to learn about new technologies that improve soil productivity and to purchase fertilizer on credit. Elisabeth applies a rotation of maize and cowpeas on her eight fields. Maize, sometimes intercropped with cassava, is grown during the first 'long' rainy season; cowpeas are cultivated in the 'short' season thereafter. Instead of cowpeas she occasionally grows a cover crop of mucuna, which produces a lot of biomass that she recycles into the soil just before the next season. The cover crop also kills the weeds. Every year she decides on which field she will grow mucuna to improve or as she says to 'revive' the soil. Elisabeth is not so much affected by land insecurity. She owns most of the fields. Only two fields are rented. The owners however cannot take the rented land away after they see that it is productive. Elisabeth can farm on these fields during a well-defined period, expressed either in years or in terms of the length of the oil palm trunks. These periods vary generally between 5 and 15 years. She therefore is not so much upset to return rented land to its owner since she sees for herself how quickly the results occur. Elisabeth has learned a lot from working in the ISFM project, from the experiments she carries out, and from the exchange of experiences and ideas among the participating farmers. The support of the extension agent living in the village has also been important, in particular at the start of Elisabeth's involvement in the project. She always makes a profit unless the rainfall is catastrophic. Normal years are always profitable. She feels better about herself; she now has a "say" in family matters. Her work has changed the lives of her family. Elisabeth has benefited from IFDC's ISFM project; with the profits from her farm, she has built two small houses, bought two bicycles and more clothes, and is now able to educate her four children.

The Challenge

Population experts expect the world's population to grow by 3-4 billion people during the next 50 years. To satisfy the food demands of a burgeoning population, most experts estimate that cereal production must increase by approximately 40%. Developing countries are expected to account for approximately 85% of the increase in global demand for cereals. The necessary increases in crop production must come from higher yields rather than bringing more land under cultivation.

Half of the world's people still live on less than $2 per day and spend 50%-70% of their income on food alone. Poverty alleviation is essential because poverty ruins people's lives and undermines development. According to the United Nations International Children's Emergency Fund (UNICEF), a child born in the developing countries is 40% more likely to live in extreme poverty. It is estimated that 29,000 children die every day, primarily from poverty- and malnutrition-related causes.

"The Particularity of the African Agricultural Situation"

African agriculture is different from agriculture elsewhere in the world by its low production and very low use of inputs like fertilizer. Therefore, through agriculture, farmers are mining the soil; more nutrients are taken out of the soil than are replaced. Properly used fertilizers could replenish such nutrients, but farmers here use less than anywhere in the world: about 10 kilograms per hectare yearly. Probably the most important reason is the riskiness and the low profitability associated with the use of fertilizer, either because of drought or the low crop yields or simply the fact that fertilizer may cost more than what the farmer gets for his crop in the marketplace.

Another particularity is seen in the fact that overpopulation is possible at a low absolute population density when the natural resources are very poor. The climates are very unpredictable, and the soils are very infertile. Therefore, agriculture is already over-exploiting the soil when there are still relatively few people living on it. An overpopulation at low population density means that there is slow market development. There is almost no market outside the rural population itself. Because of the low population density, transportation infrastructure develops very slowly. The densities of paved roads in Africa remain among the lowest in the world. For example, in Ethiopia there are 66 km of paved roads per million population, compared with 20,987 km in the United States. Therefore, the price of inputs that come from elsewhere is very high. The price that farmers can obtain for their products is very low. Recognizing the particularities of sub-Saharan Africa, IFDC adapts its approach to the development stage of agriculture and to national socioeconomic conditions.

IFDC's Answer to the Challenge

To meet the challenge of ensuring food security for a growing population in the transitional and developing countries, IFDC uses innovative approaches to:

- Introduce and promote integrated soil fertility management strategies so that agricultural systems become productive and sustainable;

- Assist countries in developing market economies with sound economic policies that will unleash the enterprise and creativity necessary for economic development;
- Develop and introduce decision support systems that integrate socioeconomic and biophysical models;

- Promote development of technologies and institutions and facilitate dialogue between stakeholders for sustainable agriculture;
- Improve smallholder farmers' access to agricultural inputs through harmonization of regional trade particularly in sub-Saharan Africa.

IFDC contributes significantly to poverty alleviation by promoting sustainable agricultural development through the efficient and environmentally sound use of plant nutrients and other agricultural inputs and through the creation of market economies that will spur economic development and generate employment. At the same time, IFDC recognizes the adverse effects of the overuse of fertilizers in some developed countries; therefore, in the developing countries we emphasize the judicious use of fertilizer to avoid resource depletion and land degradation.

> The perception is that farmers are adding nutrients. The reality is that they are not only replacing nutrients that crops use to grow but also maintaining the fertility of the soils.

Areas of Focus

- **Institutional Development Program**

The main function of the **Institutional Development Program** is to increase agricultural production through the creation, development, and nurturing of a private sector that will undertake the various functions necessary to enhance agricultural productivity. Specific objectives are to:

- Identify problems and opportunities related to agricultural input and output market development in developing and emerging market economy countries;
- Design programs (with our partners) that address development assistance needs;

- Implement development projects that create agricultural markets.

- **Economics and Policy Development Program**

The main function of the **Economics and Policy Development Program** is to provide economics expertise as needed to support the achievement of the IFDC mission. An enabling policy

environment has been recognized worldwide as an essential prerequisite for developing agricultural markets. Macroeconomic stability, nondistorted pricing environment, and enforceable and enforced regulatory frameworks are pillars to support well-functioning and efficient markets. The Program ensures through market assessment work, project development and advisory services, and policy analysis and dialogue that developing and transitional economies provide an enabling environment for agricultural markets. Additionally, this program is also involved in analyzing the feasibility of investment programs, socioeconomic suitability of new technologies, implications of multilateral trade agreements for agriculture and agribusiness, and economic and policy measures needed to protect the environment. The Economics and Policy Development Program has completed several policy and market assessment studies including *An Action Plan for Developing Sustainable Input Supply Systems in Malawi*, *Agricultural Input Markets in Nigeria: An Assessment and A Strategy for Development,* and *Implications of the Uruguay Round Agreements for Agriculture and Agribusiness in Bangladesh.*

- **Fertilizer Materials Program**

The main functions of the **Fertilizer Materials Program** are to conduct research and development projects that characterize and identify the most efficient use of fertilizer raw materials including phosphate rock and to develop processes to use these raw materials in fertilizer production. The program can be divided into five main areas of emphasis:

Potassium helps plants fight stress, disease and prevent injury—like calcium helps people build strong bones.

- Utilization of indigenous resources;
- Characterization and evaluation of raw materials;
- Fertilizer properties and production;
- Development of organic-inorganic nutrient products; and
- Environmental issues in fertilizer production.

The program engages in contractual arrangements and research projects in collaboration with private companies, government organizations, and international organizations. Production economics and environmental issues as they relate to developing-country agriculture are of particular concern.

- **Soil and Nutrient Dynamics Program**

The goal of the **Soil and Nutrient Dynamics Program** is the increased production of food and fiber in a more economical, sustainable, and environmentally sound manner in the developing countries. The Program's main function is to understand, iden-

Shefki Haxhiu, Albanian Farmer—Profile of a Transformed Life

With only 1,000 square meters of land and a small greenhouse, Albanian farmer Shefki Haxhiu managed to save enough money from the sale of his tomatoes and cucumbers to expand his greenhouse. With the rest of his earnings, he transformed his father's piece of hilly land into a vineyard for growing grapes and olive trees. He doubled his harvest of grapes in 3 years and in 2000 harvested five times as much as his original harvest. "Through IFDC-Albania television programs, I learned how and where to buy the best inputs," farmer Haxhiu says. "IFDC-Albania publications taught me how and when to use fertilizers, such as urea and single superphosphate, on my olive trees to boost production. By using this information, I was able to almost quadruple my harvest per tree, from 4 kg in 1993 to 15 kg in 1999."

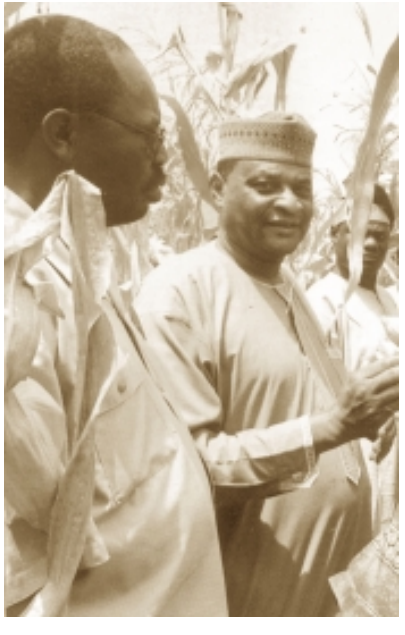
tify, and apply mechanisms to foster the adoption of agronomic technologies and socioeconomic measures that enhance the efficiency of: (1) nutrient use by crops, (2) nutrient recycling, and (3) soil fertility improvement. Improved fertilizer use recommendations, risk assessment, sustainability indices, and environmental impact assessment are developed through the use of analytical methods, remote sensing, and decision support systems designed to account for interactions of soil properties, climate change, crops, nutrient management, available inputs, and socioeconomic factors. The program works closely with advanced research organizations (AROs), universities, international agricultural research centers (IARCs), and national agricultural research and extension systems (NARES) from developing countries.

- **Integrated Intensification Program**

The **Integrated Intensification Program** focuses on integrated soil fertility management technologies to improve the economic feasibility of fertilizer use in West Africa and to decrease its environmental risks by increased use efficiency. These technologies integrate the use of soil amendments and inorganic fertilizer and lead to increased availability and accessibility of plant nutrients due to improvement and maintenance of soil quality. Locally available sources of organic matter are the main soil amendments.

Their availability and quality increase progressively because of the use of inorganic fertilizers and the progressive improvement of the soil organic matter status. "One-time" investments of phosphate rock and lime can enhance the efficiency and profitability of inorganic fertilizers and other external inputs. Such investments will benefit not only farming communities but also society as a whole. This implies cost sharing among all beneficiaries and firm governmental commitment in the form of a national soil fertility action plan for which support and expertise can be obtained through IFDC. The development and promotion of integrated soil fertility management technologies require the Integrated Intensification Program to adapt fertilizer recommendations. A system approach, using modeling and simulations, is therefore a valuable tool. The concerned research is demand driven. Experiments are conducted with farmers' participation on their own fields, which serve as open classrooms and laboratories for testing and adapting technologies. IFDC supports national agricultural research institutes, extension services, and nongovernmental organizations in this approach.

- **Input Accessibility Program**



The Input Accessibility Program aims to support the development of integrated soil fertility management strategies at the regional level in West Africa. The program explicitly focuses on the adoption process and combines the participatory development of technological packages with measures that facilitate institutional change and, in particular, improve the linkages between smallholders and input (including credit) and output markets. IFDC works with national agricultural research and extension services and

nongovernmental organizations (NGOs) to implement regional-level projects, based on the effective participation of the key stakeholders, i.e., farmers, bankers, traders, and regional policy makers. Preference is given to regions with comparative advantages for intensive food and/or livestock production for the local, regional, or international markets. The program develops organizational and financial capacities within the farming communities to handle problems related to input supply and the production and marketing of agricultural produce, which are instrumental in the transition to more productive and sustainable agricultural production. IFDC recognizes the obvious need to enable women who are the pillars of rural economies to participate in development projects to solve their own problems and realize their expectations. The intervention strategy of IFDC includes measures to involve women farmers at all levels of project design and implementation and to facilitate their access to knowledge, technologies, production inputs, and markets.

- **Policy and Market Program**

The **Policy and Market Program** aims to promote the creation of favorable policy and socioeconomic environments for the improvement of soil fertility in sub-Saharan Africa. It undertakes activities covering the policy and market development issues that directly or indirectly influence incentives to invest in soil fertility improvement. The policy aspects cover general policy orientations of individual countries or subregional groupings that affect decisions to invest in soil fertility improvement. The market development aspects cover activities related to private sector input dealers, farmers, and their organizations. It thus facilitates

Lack of proper nutrients lowers plants' ability to withstand weather, diseases and other stress conditions.

dialogue among public sector decisionmakers, farmers and their organizations and private sector input dealers in an era when the state is no longer directly involved in the procurement of inputs, production, processing and marketing of agricultural products. The program's partners include policymakers at the national and subregional levels, input dealer or trade associations at the national or sub-regional levels, and farmers' organizations at the national or subregional levels. It also collaborates with the network of market information systems in the West African subregion to develop an internet-based agricultural market information system that serves policymakers, farmers and the private sector input dealers. The web site will eventually be managed and used as the medium of exchange by the regional association of agricultural input dealers that the program is helping to organize. The Policy and Market Program has also provided training for leaders of several farmers' organizations to strengthen their organizational and lobbying capacity and to link them to input suppliers.

• Human Capacity Building

The philosophy of human capacity building at IFDC is that knowledge and skill are absolutely essential requirements in the efforts of developing countries to meet the challenges of privatization, globalization, and market development. Training is essential to improve their capacity to compete in the world markets for goods and services and to promote meaningful employment in agriculture and agribusiness. Countries that have invested in education and skill development have been able to adapt and reap the benefits of the changing global economic order. Others, particularly in the developing world where access to and the level of education, skill, and training are inadequate, have serious difficulties participating in global agricultural commerce and reaping benefits for their citizens and economies. IFDC believes that education, skill development, and training, provided they are supported by a favorable national and international economic policy, can make a contribution for countries, enterprises, and individuals to benefit from globalization, overcome constraints, create more and better jobs, and improve incomes and living conditions. IFDC provides training in the use of modern techniques in research to address nutrient production and use to maximize products without adversely affecting the environment. During the past quarter century, IFDC has provided opportunities to more than 8,000 professionals, including entrepreneurs, farmers, agronomists, agribusiness specialists, policymakers, government officials, and others engaged in agriculture in developing countries and transitional market economies to enhance their skills and knowledge in a wide variety of agriculture-related disciplines.

Making a Difference in . . .

• Albania

In the early 1990s, IFDC began assisting the Government of Albania in establishing a working and vibrant market economy in that

country's agricultural sector. The IFDC project created a fully privatized market for agricultural inputs, assisted Albania in developing an efficient national agricultural statistical system, developed a supporting institutional capability, and nurtured the development of the highly successful Albanian Fertilizer and Agricultural Inputs Dealers' Association (AFADA). Private enterprises are now supplying 100% of Albania's fertilizer requirements, 95% of crop protection products, and 80% of certified imported and domestic seed. Four-fifths of all farmers are using fertilizers, and nearly one-half are using improved seed. Yields of wheat and maize have increased 22%, and many farmers have shifted to more high-value horticultural crops. Better fertilizer and seed laws, reductions in tariffs, and the establishment of viable seed and soil institutes capable of serving farmers and agribusinesses enhanced these improvements. During the past 3 years IFDC has assisted Albania in nurturing private sector-led growth in agriculture and business by successfully establishing eight democratic and functioning agricultural trade associations, a federation of 18 trade associations as an effective voice for advocating policy reform, and the partnership of eight of them in an Association Business and Management Center that aims to be effective and self-sufficient. Since 1998 farm income in Albania has increased by 64%; export of fresh vegetables has increased by 247%; and Albanian

Plants need phosphorus for energy just like people need carbohydrates in their diets.

Belayet Hossain—Bangladeshi Rice Farmer—Profile of a Transformed Life

Belayet Hossain, a Bangladeshi rice farmer, has hope for a brighter tomorrow for his family, thanks to a fertilizer that was introduced by an IFDC project in his country. By placing this fertilizer—urea supergranules or USG—into the soil, Hossain and other Bangladeshi farmers are increasing their rice yields by more than 25% and realizing more than 50% greater profits. With this environmentally sound fertilizer, losses of nitrogen amount to only 30%, compared with 70% for the traditionally used prilled urea, which is broadcast over the fields. This translates into an extra profit of TK 1,200 ($24.33) per hectare.

entrepreneurs have exported $2.1 million worth of food products. The project clients have invested millions of dollars of their own money in agribusiness and increased their production and revenues by more than 60% in 2 years and employment by 25%.

Making a Difference in . . .

• Bangladesh

One of IFDC's most outstanding success stories is in Bangladesh, where a 15-year project completely restructured the fertilizer sector and instituted a freely competitive marketing system, which created a network of more than 100,000 private entrepreneurs who entered the marketplace to meet the immediate retail demand for fertilizer. The retail price of fertilizers was reduced, and fertilizer sales were increased. Privatization of fertilizer marketing and distribution significantly improved both employment and agricultural production. A solid 45,000 jobs were created. The improved fertilizer distribution system was an economic boon because it was part of a full, economically viable technical package that also included high-yielding rice and maize varieties and improved irrigation. Use of these improved technologies increased farmer profits by 35%. As a result of the program, income increased $600 million per year for paddy production and $750 million per year for all crops. A prime result of this project was Bangladesh's achievement of self-sufficiency in rice in the early 1990s; rice production has increased by about 70% since the mid-1970s.

In the mid-1990s IFDC initiated another project in Bangladesh that increased the productive employment in agriculture and related enterprises through the creation of competitive markets for agriculture-related inputs, outputs, and technologies. Against a target of 100,000 over 5 years, 700,000 farmers adopted more productive, environmentally sound technology, mainly through the use of USG fertilizer. Compared with a target of 80, contract grower arrangements numbered 172. Investments/loans made in agribusiness totaled 12,700, compared with the target of 7,000. Representing 2.5 times the goal, $257 million in credit and investment was realized. New agribusiness jobs were created for 70,000 people, and more than 50 significant policy reforms were enacted.

Togbe Sodjedo, Togolese Rice Farmer—Profile of a Transformed Life

Togbe Sodjedo, a Togolese rice farmer, has seen a marked improvement in the quality of his life since he began participating in a project, being conducted by the Africa Division of IFDC, which promotes ISFM strategies. Rice growing is the primary activity of farmer Sodjedo, and it appears to be a very profitable one. Because of this activity, he was able to construct a nice house on his compound, to buy additional land (2.5 ha of land, outside the irrigated area), to buy potential sites for housing, to buy a motorized cultivator, and to support his family. Besides rice, he also cultivates 1 ha of maize for home consumption. Growing two crops per year on his 3-ha farm to which he applies 1,150 kg of fertilizer for each crop cycle, Sodjedo receives a yield of 2,500 kg of shelled rice per hectare. For one plot of 500 m², he applies about 10 kg of fertilizer twice. The Togolese farmer has also used indigenous natural rock phosphate and was pleased with the positive results. Of particular benefit to the farmer was the access to credit, provided by the ISFM project, through which he became a member of a self-managed savings and credit system at the village level.

More recently IFDC has concentrated on an environmentally friendly project in Bangladesh to increase paddy yields from less use of chemicals, particularly fertilizers. The beneficiaries are resource-poor farmers in selected areas of Bangladesh, Nepal, and Vietnam. IFDC provides technical assistance and coordination of activities of NGOs that work directly with farmers to evaluate and adapt promising nutrient management practices for adoption by farmers. For paddy cultivation, losses of nitrogen are great. Typically about 30% plant recovery is obtained from the broadcast applications of urea, but research has proven that placement into submerged soils eliminates much of the gaseous and runoff losses. Urea deep placement (UDP) using urea briquettes or USG is labor intensive, provides high yields from less fertilizer, is environmentally friendly, and appears to be feasible for use by small-scale resource-poor farmers. Bangladesh's Department of Agricultural Extension reported that UDP was performed on 379,000 ha of paddy during 2000/2001. More than 5,000 farmers have received training in the technology. In general during dry seasons, farmers obtain about 1,000 kg/ha more paddy (an average 20% increase) from UDP than from their broadcast urea applications and use 20%-30% less urea.

Making a Difference in . . .

- **Benin, Burkina Faso, Ghana, Mali, Niger, Nigeria, and Togo**

Farmers in Benin, Burkina Faso, Ghana, Mali, Niger, Nigeria, and Togo are benefiting from a project that IFDC is conducting in their countries. The project is producing considerable evidence that ISFM provides a feasible pathway for sustainable agricultural intensification and a way out of the vicious cycle between poverty and land degradation. ISFM strategies are based on the combined use of soil amendments, chemical fertilizers, crop residue recycling, green manure, etc. IFDC has forged partnerships with the countries' extension services, rural development projects, and NGOs. Farmers, bankers, traders, and policymakers at the local level have become the key stakeholders. IFDC collaborates with both international and national agricultural research institutes to develop new ideas on ISFM technologies for different agroecological zones. Technological options that appear to be of interest for the ISFM village-level projects are considered for experimentation through a participatory screening process that in-

Ibush Krasniqi, Kosovar Wheat Farmer—Profile of a Transformed Life

Kosovar farmer, Ibush Krasniqi, could hardly believe his eyes, but he saw for himself the impact of modern agricultural technology on his field in Bardh te Vogel, Kosovo. Krasniqi's farm was selected as one of the sites for demonstrating the potential yields that can result when the right mix of crop varieties, fertilizer, water, etc., is applied in the right quantities and at the right time. Wheat yields in Kosovo normally average a low of 2-2.5 tons per hectare, which falls short of satisfying the needs of the country's population. Extension experts told Krasniqi that he could expect a yield of 4-5 tons per hectare from his wheat field with the appropriate application of fertilizer. IFDC is working in Kosovo to assist in the development of agribusiness and agriculture in that country. Farmers like Krasniqi and their families are the beneficiaries of that work.

volves IFDC staff, the partner institutions, and the target farmers. Farmers' experiments and alternative ideas are also taken into account. The process results in the design of learning plots—experiments set up with the farmers to test and fine-tune ISFM options. Preference is given to regions with a relatively high potential for intensive food crop production oriented toward local food markets. The profitability of the ISFM packages varies from one year to another as a consequence of rainfall, changes in implementation, and eventually changes in soil fertility. Yields on ISFM plots are typically twice or sometimes three times higher than average levels. Return on (invested) capital exceeds 100%, with a value:cost ratio well above 2, and returns to family labor are 2-6 times higher than the average salary rate prevalent in the region. The progress of ISFM work has been impressive:

- The number of countries involved in the project has grown from 3 in 1998 to 7 in 2002;
- The number of pilot areas, from 7 to 17;
- The number of villages, from 28 to 91;
- The number of farmer participants, from 231 to 1,625;

"There may be risks in using fertilizer; however, the risks of not using them are even higher. If we do not address the nutrient status of the soil, we are going to have an environmental disaster."—Dr. Henk Breman, Director, IFDC's Africa Division

- The number of NGOs involved, from 6 to 17; and
- The number of farmer-managed credit systems, from 0 to 13.

The concept of ISFM can work if farmers, traders, researchers, extension agents, and policymakers at national and regional levels invest and collaborate actively.

Making a Difference in Eastern Africa . . .

Farmers in Eastern Africa are constantly challenged by infertile soils and drought. Yet the cost and accessibility of fertilizers and the risk of crop failure due to drought limit the amount of fertilizer used by resource-poor farmers in the region. Since 1998, IFDC has collaborated with the International Maize and Wheat Improvement Center (CIMMYT) in eastern and central Africa to help poor farmers overcome these difficult problems. CIMMYT breeders have developed maize varieties that are able to tolerate drought and low soil fertility and produce higher yields with less fertilizer inputs. IFDC's soil scientist/agronomist in Nairobi works closely with CIMMYT breeders and socio-economists and national agricultural research system (NARS) scientists in the region to test these new maize varieties on-farm with direct farmer partici-

pation in so-called "Mother-Baby" trials. In 2001, about 700 farmers tested new varieties on their farms under their own management in small 4-6 plot "Baby" trials. The farmers also had the opportunity to see the potential of these varieties when planted in their community by researchers with optimal fertilizer management in "Mother" trials. The "Mother-Baby" trials serve the threefold purpose of evaluating advanced new varieties under diverse conditions, exposing farmers to new varieties, and incorporating their criteria and evaluation in the selection process. Based on this exposure and farmer feedback, several new varieties have entered the national certification process in Kenya for release.

To help farmers gain the most from these drought and infertile soil-tolerant varieties, IFDC and CIMMYT work with NARS scientists in the East and Central Africa Maize and Wheat (ECAMAW) Network to test and disseminate cultural practices that improve soil fertility and conserve soil moisture. Much emphasis is placed on the use of organic sources available or produced on-farm and on the integration of fertilizers with organic sources. During the past 3 years, trials by network scientists in Ethiopia, Uganda, Tanzania, and Kenya have tested grain legumes, green manure/cover crops, animal manures and composts in combination with inorganic fertilizers in over 250 on-farm and on-station trials. These trials have exposed farmers to new legume species (such as soybeans) with which they were previously unfamiliar, and many are enthusiastically adopting them to the extent that they are growing them in monoculture. Locally adapted green manure species have also been identified and tested in different systems with maize and in comparison and combination with fertilizer nitrogen sources. Based on this research, ECAMAW scientists are promoting "Best Bet" systems on farmers' fields with new low-N tolerant maize varieties to take greater advantage of the N derived from legume components in the system.

Research is also being undertaken to adapt water-harvesting methods for the dry land maize-producing areas of eastern Africa. Tied ridges are being tested in combination with drought-tolerant maize varieties from the CIMMYT breeding program. In these environments, fertilizer use is much riskier than in more favorable environments. However, use of soil moisture conservation practices, in combination with stress-tolerant varieties, potentially reduces risk of crop failure and makes investments in soil fertility improvement more possible. In northern Tanzania, ECAMAW scientists have promoted the tied ridge technology with farmers for three seasons. While many have seen the benefits of the technology during drought years, they have not had the appropriate tools to economically prepare the land. This year over 20 farmers are comparing tied ridges with conventional land preparation on large half-hectare plots using a locally adapted implement and drought-tolerant maize varieties. Scientists are hopeful that the implement and increased production with new varieties will lead to greater adoption of the technology in the future.

Making a Difference in . . .

- **Kosovo**

With funding from USAID, IFDC is working to establish in Kosovo a trade association support network for agricultural input and agribusiness development similar to the successful model in Albania. The Kosovo Agribusiness Development Project (KADP) is:

- Promoting market-oriented reforms;
- Assisting in the development of financially sustainable trade associations;
- Establishing linkages in the agribusiness sector, such as the private sector extension system pioneered in Albania;
- Helping nascent agricultural enterprises through targeted business and marketing support; and
- Facilitating access to credit.

The project is producing results: since 1999 its clients have realized a 37% increase in agricultural production, and salaries in private enterprises rose by 27% in 2001. The project has:

- Implemented policy reforms on import tariffs,
- Organized several successful trade missions and staff training programs,
- Introduced and tested new high-yielding crop varieties, and
- Conducted numerous field days in conjunction with the private sector.

Over the long run, sustainable agriculture will enhance the quality of life.

Of all Kosovar enterprises recently surveyed, 77% have made investments in private enterprises; the employment generated by these investments increased by 32% compared with 1999 figures. The technical assistance to Kosovo's entrepreneurs has resulted in increased agricultural input availability as follows:

- Fertilizer—from 40,000 mt of imports in 1999 to 72,000 mt in 2001;
- Improved seeds—from 16,000 mt imports in 1999 to 30,000 mt in 2001; and
- Crop protection products (CPPs)—from 2,500 mt imports in 1999 to 7,800 mt in 2001.

As a result of better quality agricultural input availability, better access by farmers, better prices, and a sound private extension program, the yields of the main crops have increased significantly in the past 3 years. In 2001 the yield of wheat was 3.6 mt/ha, compared with 1.8 mt/ha in 1999. The yield of maize in 2001 was 4.2 mt/ha, compared with 2 mt/

"Mining" the soil is what plants do. Each season, they mine the nutrients they need in order to grow.

ha in 1999. The yield of potatoes was 11 mt/ha in 2001, compared with 7.4 mt/ha in 1999. As for the poultry industry, the total number of domestically produced eggs increased by about 17% in 2001, compared with 7% in the year 2000.

Making a Difference in . . .

• Afghanistan

IFDC is participating in the rebuilding of Afghanistan's agricultural sector. The Center is initiating an emergency program to organize the private sector, which will provide much-needed fertilizer to help the country jump-start its agricultural production and to alleviate hunger and poverty. The expected result of the activity will be that some 150,000 Afghan farmers will use good seed and apply fertilizer during 2002 with an anticipated doubling of production from fertilized fields. Commercial agricultural input supply activities will be restarted or strengthened. Despite its current problems, Afghan agriculture can recover again. Along with its partners, IFDC can help the resilient Afghan people to replace despair with hope for a better tomorrow. Using IFDC's holistic approach to rebuilding the country's agricultural production system, the Center will be available to assist Afghan entrepreneurs in establishing a market economy to trigger economic development in their country.

Making a Difference in the Andes (Bolivia, Peru, Ecuador, Colombia, and Venezuela). . .

Similar to a slow-growing cancer, soil degradation is eating away at the livelihoods of thousands of poor farmers in the Andes. Cultivation on steep slopes and a tendency to overwork the soil are causing the loss of productive topsoil by both water and tillage erosion. With the loss of soil, there is also a severe and continuing reduction in the carbon content, the nutrient-supplying capacity, and the water-holding capacity of the soil that remains. Many farmers realize that present practices are degrading their land and sacrificing its long-term productivity, but they remain focused on the short term because of the immediate need for food and income.

In an effort to reverse the degradation of natural resources and make food production systems in the

Andes sustainable, IFDC has joined forces with a wide range of partners in the Consortium for the Sustainable Development of the Andean Ecoregion (CONDESAN). With coordination assistance provided by the International Potato Center (CIP), CONDESAN links public and private sector partners in research, training, development, and policy making to promote the sustainable use of natural resources and improvements in welfare and equity for the people of the Andes. With more than 75 institutions as members, CONDESAN facilitates more efficient communication and links between research and development projects at benchmark sites in Bolivia, Colombia, Ecuador, Peru, and Venezuela.

Through its partnership with CIP and CONDESAN, IFDC has been able to apply its expertise in simulation models and soil management toward the development of effective decision support systems that link biophysical and economic information for assessing tradeoffs between agricultural production and environmental impact. These systems are being refined further to serve as watershed analysis tools that will help local communities better manage their land and water resources. In recognition of the International Year of Mountains (2002), IFDC contributed to the development of a multimedia product that compares watershed dynamics across eight different watersheds in the Andes and the Himalayas. Recognizing the need for a more fundamental understanding of nutrient cycling processes in mountain agroecosystems, IFDC has also worked with CONDESAN partners to develop a regional network of scientists referred to as MOSAndes (Management of Soils in the Andes). The MOSAndes network has eight coordinators representing 50 researchers from seven countries.

Making a Difference in. . .

- **Azerbaijan**

In February 2002 IFDC initiated a 3-year agribusiness development project, which is targeted to help boost Azerbaijan's agricultural production, spur agribusiness growth, and generate employment. The project will form clusters of agricultural input dealers in four key regions to improve their ability to supply vital inputs and technology to farmers. The IFDC project is providing technical assistance to improve the efficiency and profitability of the agricultural input businesses and assist them in making the transition to a market economy. IFDC will provide business, technical, and management training; market information; and improved access to credit and finance. The objective is to provide missing vital components that will generate private-sector-driven economic growth and rural employment. The project will help to organize current and potential agricultural input suppliers to form trade associations. The agricultural input dealers' industry group and eventual federation with other agricultural trade associations can become an effective channel for advocating a more favorable business climate and policies. This association will serve as the catalyst for the much-needed transfer of improved technology to farmers. The project will establish demonstration farms and technology transfer programs in the

four main agricultural regions of Azerbaijan. By teaching the private dealers the value and methodology of demonstration farms, the project will also help establish private sector extension services. The Azerbaijan project expects to:

- Double the commercial trade in fertilizer, seed, CPPs, and animal feed;
- Support over 150 agricultural input dealer enterprises;
- Help them establish an effective and sustainable trade association; and
- Assist clients in gaining access to more than $750,000 in new credit and investment.

Making a Difference in Southern South America. . .

During the past two decades, Latin America has experienced a decrease in agricultural growth and an increase in rural poverty. In fact, the United Nation's Economic Commission for Latin America and the Caribbean estimated that in the mid-1990s 53% of the rural households in the region had incomes that were less than the cost of a basic basket of food. One of the clearest pathways to revert this regressing process is to ensure the sustainable increase in the productivity of the existing agricultural systems in ways that will ensure enhanced availability of food and fiber, while preserving a healthy environment.

IFDC is responding to these challenges in southern South America by developing and establishing Information and Decision Support Systems (IDSSs). These IDSSs combine the use of modern information tools (remote sensing, simulation models, geographic information systems, probabilistic seasonal climate forecasts) with existing databases to generate products that can be easily understood and readily used to assist the planning and decision-making of stakeholders acting in the public and private agricultural sectors of the region. For example, the IDSS that IFDC is developing with the National Agricultural Research Institute (INIA) of Uruguay is being used to assist governmental planning agencies to identify the best land uses for different areas, issue drought/flood alerts, identify regions with highest needs for receiving aid in extreme events such as droughts, develop crop production forecasts, and assess production risks for establishing agricultural insurance programs. IFDC is also helping farmer cooperatives and NGOs to reduce the vulnerability of their production systems to the huge climate variability typically existing in the region. This is accomplished by identifying farm management practices that are best adapted to the most likely climate conditions expected for the following season, considering probabilistic climate outlooks (based, for example, on El Niño conditions and forecasts). An important feature of the work that IFDC is establishing using the IDSS approach is that it allows for the use of the vast amount of information that is typically available in developing countries, generated by the national institutes. The work is also contributing to building the human capacity in the region since national scientists are being trained in the development and improvement of IDSSs. Moreover, the methods and tools that IFDC is developing in the South American work are being used to begin establishing similar IDSSs in other developing countries.

Making a Difference in . . .

• Kyrgyzstan

In late 2001 IFDC began a 2-year pilot project aimed at improving productivity of agriculture and competitiveness of agricultural enterprises in the Ferghana Valley of Kyrgyzstan. The project will expand use of appropriate technologies and increase the growth of private sector enterprises and investment in agricultural input supply and marketing and, thus, increase access by farmers to critical inputs needed to boost agricultural production. The project will establish viable private sector agricultural input marketers and identify the policies and mechanisms required to support them and potential counterparts throughout the country and region. An agricultural input network was established for the spring 2002 planting season and set the stage for seed production, information systems, and policy reform. The primary result of the project after 2 years will be to provide assistance to the recently established trade association in gaining access to credit, business planning, trade opportunities, policy advocacy, extension, value-added training, and other beneficial services.

Making a Difference in . . .

• Nigeria

In late 2001 IFDC began a project in Nigeria to promote private sector-based agricultural input marketing, with a special focus on fertilizers. The purpose is to nurture and fortify open and competitive markets and dealer networks in the pilot area as the primary mechanisms to improve farmer access to appropriate agricultural technologies. The project will improve smallholder access to modern production technologies. It will contribute to rural enterprise development, an improved policy setting, natural resource management, new dealer and agricultural trade associations, and various partner relationships, including with farmer groups in the pilot area. The project will undertake economic analysis and engage in continual dialogue with the government regarding the range of issues affecting the expansion of marketing in fertilizer and other inputs.

The project will identify, train, and organize agricultural input dealers to develop a reliable and competitive supply of inputs to farmers. It will also establish a market information system initially concentrated on the agricultural input and crop output situation in the pilot zone. Representatives of the Federal Government of Nigeria and the International Institute of Tropical Agriculture (IITA) in Nigeria are also participating in this project.

Making a Difference in . . .

- **Malawi**

Because of IFDC's demonstrated success in establishing effective and sustainable private sector agricultural input marketing systems, trade associations, small and medium enterprises, and technology transfer in Albania, Bangladesh, and Kosovo, the Center has been selected to conduct an agribusiness project in Malawi. At the request of the Malawi Ministry of Agriculture and Irrigation, IFDC is implementing an Agricultural Input Markets Development project aimed at addressing constraints to sustainable agricultural development and improve smallholder farmer access to improved seeds, fertilizer, and CPPs. To achieve this objective, the project will work to establish a vibrant private sector-led agricultural input supply and marketing system by providing direct technical assistance to entrepreneurs and bankers through training programs, workshops and study tours. It will strengthen the institutional capacity of the government with regard to information collection, analyses, and dissemination. The project will design and assist in implementation of a regulatory system critical to an orderly market development.

Funding

Planning funds to establish IFDC came from the U.S. Agency for International Development (USAID) and the International Development Research Centre (IDRC) of Canada. In addition, funds for training, technology transfer, market development, resource development, and soil fertility improvement come from a wide range of bilateral and multilateral aid agencies, national and international organizations, foundations, national governments, and private companies.

Staff

The IFDC staff, recruited from more than 20 countries, is both internationally and technically diverse with almost one-half of the total being agronomists, chemical engineers, chemists, economists, geologists, soil scientists, marketing and agribusiness specialists, communications specialists, and sociologists. Some of our scientists and marketing specialists are posted in Afghanistan, Albania, Azerbaijan, Bangladesh, Burkina Faso, Ecuador, Kenya, Kosovo, Kyrgyzstan, Malawi, Mali, Mozambique, Nigeria, Togo, and Uruguay.

Board

IFDC's program directions are shaped by a Board of Directors that is fully international and was established in accordance with standards established by the Consultative Group on International Agricultural Research (CGIAR). The members of the Board bring together a wide range of expertise in the area of agricultural development.

IFDC's Mission

IFDC—An International Center for Soil Fertility and Agricultural Development—is a public, international organization (PIO). The nonprofit center's mission is to increase agricultural productivity in a sustainable manner through the development and transfer of effective, environmentally sound plant nutrient technology and agricultural marketing expertise.

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